

WHAT IS CLAIMED IS :

1. A gigabit-capable passive optical network encapsulation method (GEM) frame structure comprising:

5 a GEM header portion and a GEM payload portion;

said GEM header portion includes values for discriminating between traffic to provide traffic multiplexing;

said GEM header further includes a payload type of a frame for a gigabit-capable passive optical network (GPON), wherein payload type information, which represents a data type

10 of a payload of the GEM frame, is displayed in the GEM header, in order to provide a GEM control frame that delivers management control information transferred from an OLT (Optical Line Termination).

2. The GEM frame structure as claimed in claim 1, wherein the payload type
15 information represents the data type of the payload of the GEM frame so as to represent that the GEM frame includes a control frame.

3. The GEM frame structure as claimed in claim 1, wherein the payload type
information represents the data type of the payload of the GEM frame so as to represent that the
20 GEM frame includes a TDM (Time Division Multiplex) data frame.

4. The GEM frame structure as claimed in claim 1, wherein the payload type
information represents the data type of the payload of the GEM frame so as to represent that the

GEM frame includes an Ethernet data frame.

5. The GEM frame structure as claimed in claim 1, wherein the payload type information represents the data type of the payload of the GEM frame so as to represent that the

5 GEM frame includes a control frame, a TDM (Time Division Multiplex) data frame, and an Ethernet data frame.

6. The GEM frame structure as claimed in claim 1, wherein the payload type information is represented by means of a reserved field, which has no predetermined value, in the header of the GEM frame.

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7. The GEM frame structure as claimed in claim 5, wherein the payload type information is represented by means of a reserved field, which has no predetermined value, in the header of the GEM frame.

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8. The GEM frame structure as claimed in claim 1, wherein the payload type information is included in predetermined fields, which has predetermined values, involved in the header of the GEM frame, so that payload type information represents the data type of the payload of the GEM frame.

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9. The GEM frame structure as claimed in claim 5, wherein the payload type information is included in predetermined fields, which has predetermined values, involved in the header of the GEM frame, so that payload type information represents the data type of the payload of the GEM frame.

10. A method for processing data in a gigabit-capable passive optical network (GPON), the method comprising the steps of:

- i) checking whether or not a received frame is an ATM frame when an OLT (Optical
5 Line Termination) receives the frame to be transferred;
- ii) transmitting the received frame in an ATM cell transmission method if the received frame is identified as the ATM frame in step i);
- iii) deciding whether the received frame is a GEM frame if the received frame is not the ATM frame, and checking whether or not the received frame is a data frame;
- 10 iv) transferring the received frame while displaying a payload type thereof by performing a data encapsulation with respect to the received frame if the received frame is a data frame; and
- v) creating a control frame by using the received frame and transferring the control frame with representing the payload type thereof, if the received frame is not the data frame.

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11. The method as claimed in claim 10, wherein step iv) includes the substeps of:

- vi) checking a transmission method of the received frame if the received frame is the data frame;
- vii) performing a TDM data encapsulation with respect to the received frame and
20 transferring the received frame with representing the payload type thereof, if the transmission method confirmed in step vi) is a TDM method; and
- viii) performing an Ethernet data encapsulation with respect to the received frame and transferring the received frame with representing the payload type thereof, if the transmission

method checked in step vi) is an Ethernet method.

12. The method as claimed in claim 10, wherein, if the received frame is the GEM frame, the GEM frame includes a GEM frame header having a field representing that a payload
5 of the GEM frame is the control frame, a TDM (Time Division Multiplex) data frame, or an Ethernet data frame, thereby representing the payload type.

13. The method as claimed in claim 10, wherein, if the received frame is the GEM frame, the GEM frame includes a GEM frame header having a field representing that a payload
10 of the GEM frame is the control frame thereby representing the payload type.

14. The method as claimed in claim 10, wherein, if the received frame is the GEM frame, the GEM frame includes a GEM frame header having a field representing that a payload
of the GEM frame is a TDM (Time Division Multiplex) data frame, thereby representing the
15 payload type.

15. The method as claimed in claim 10, wherein, if the received frame is the GEM frame, the GEM frame includes a GEM frame header having a field representing that a payload
of the GEM frame is an Ethernet data frame, thereby representing the payload type.

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16. The method as claimed in claim 10, wherein, if the received frame is the GEM frame, the GEM frame includes a GEM frame header having a field representing that a payload
of the GEM frame is one of the control frame, a TDM (Time Division Multiplex) data frame, or

an Ethernet data frame, thereby representing the payload type.

17. A method for processing data in a gigabit-capable passive optical network (GPON), in which a GPON encapsulation method (GEM) frame is transferred with representing a payload type of the GEM frame in a header of the GEM frame for performing an operation according to a represented payload type, wherein an ONT (Optical Network Terminal) supports a GEM method through the steps of:

i) receiving a frame transferred from an OLT (Optical Line Termination) so as to check whether or not the received frame is an ATM (Asynchronous Transfer Mode) frame;

ii) checking information about a payload type included in a header of the received frame as a checked result of step i), if the received frame is not the ATM frame; and

iii) processing the received frame depending on the payload type of the received frame.

18. The method as claimed in claim 17, further comprising a step of treating the received frame as an error, if the received frame is the ATM frame as a checked result of step i).

19. The method as claimed in claim 17, wherein the GEM frame includes a GEM frame header having a field representing that a payload of the GEM frame is a control frame, , thereby representing the payload type of the GEM frame in the GEM frame header.

20. The method as claimed in claim 17, wherein the GEM frame includes a GEM frame header having a field representing that a payload of the GEM frame is a TDM (Time Division Multiplex) data frame, thereby representing the payload type of the GEM frame in the GEM

frame header.

21. The method as claimed in claim 17, wherein the GEM frame includes a GEM frame header having a field representing that a payload of the GEM frame is an Ethernet data
5 frame, thereby representing the payload type of the GEM frame in the GEM frame header.

22. The method as claimed in claim 17, wherein the GEM frame includes a GEM frame header having a field representing that a payload of the GEM frame is one of: a control frame, a TDM (Time Division Multiplex) data frame, or an Ethernet data frame, thereby
10 representing the payload type of the GEM frame in the GEM frame header.